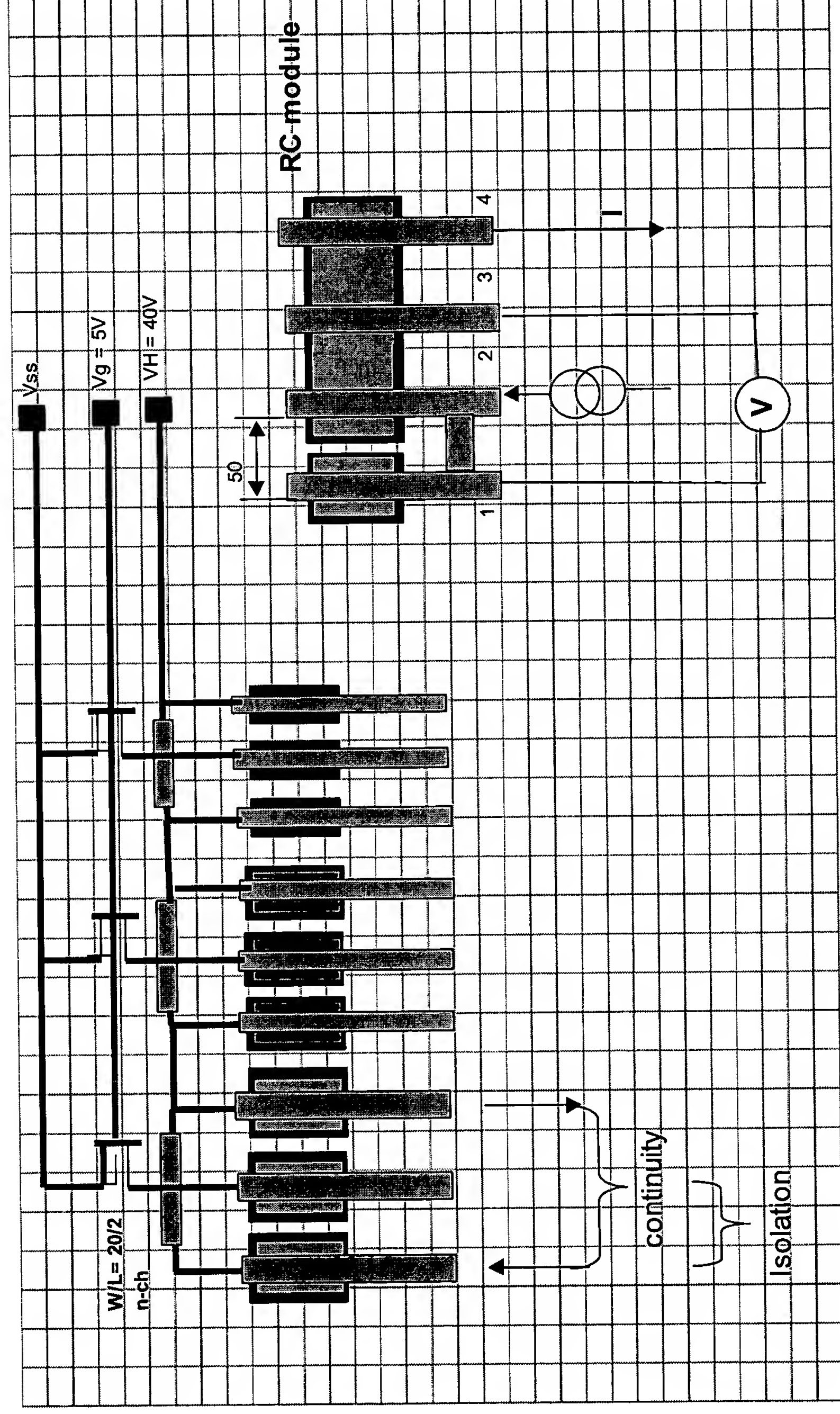


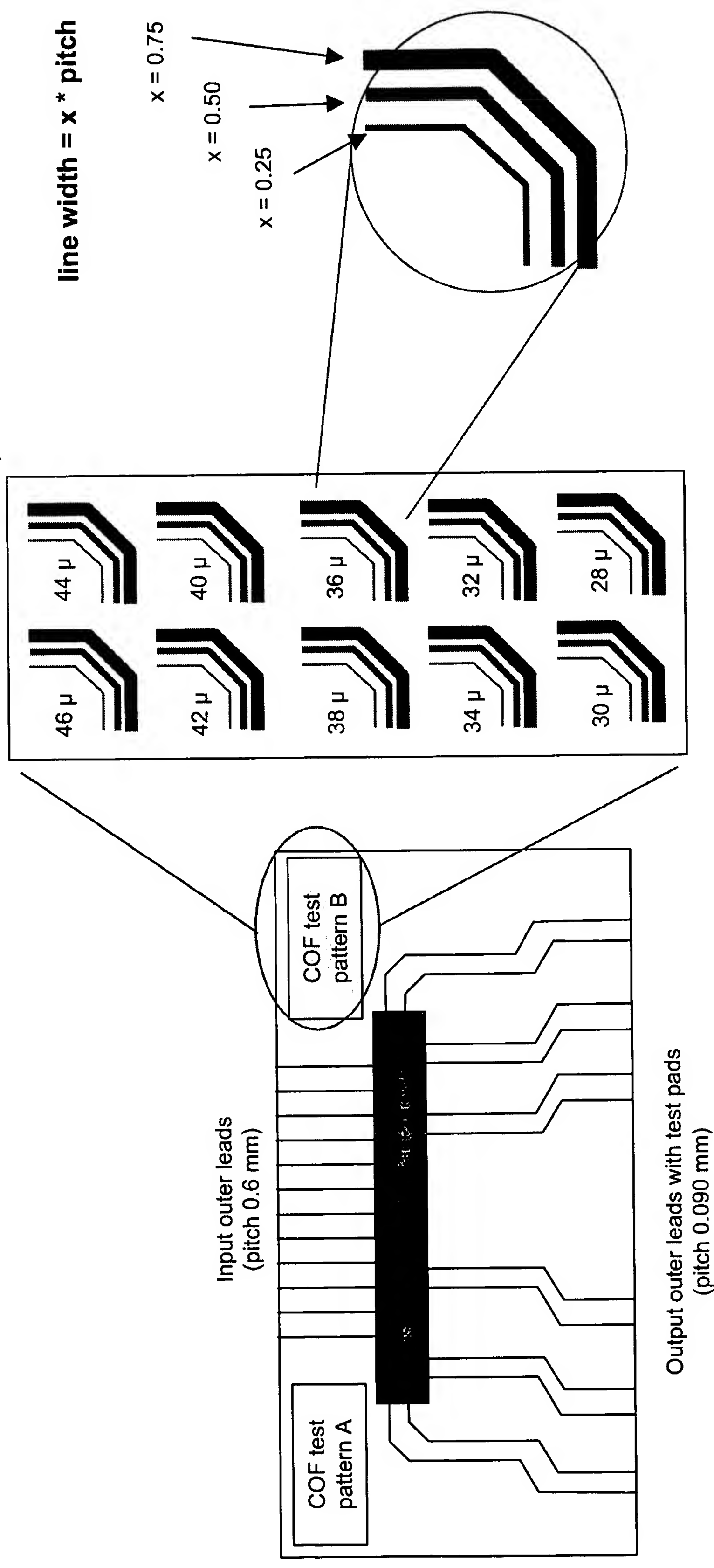
# Construction of test IC (2)

- Test structures for isolation and continuity measurements
- Au and Al bumps



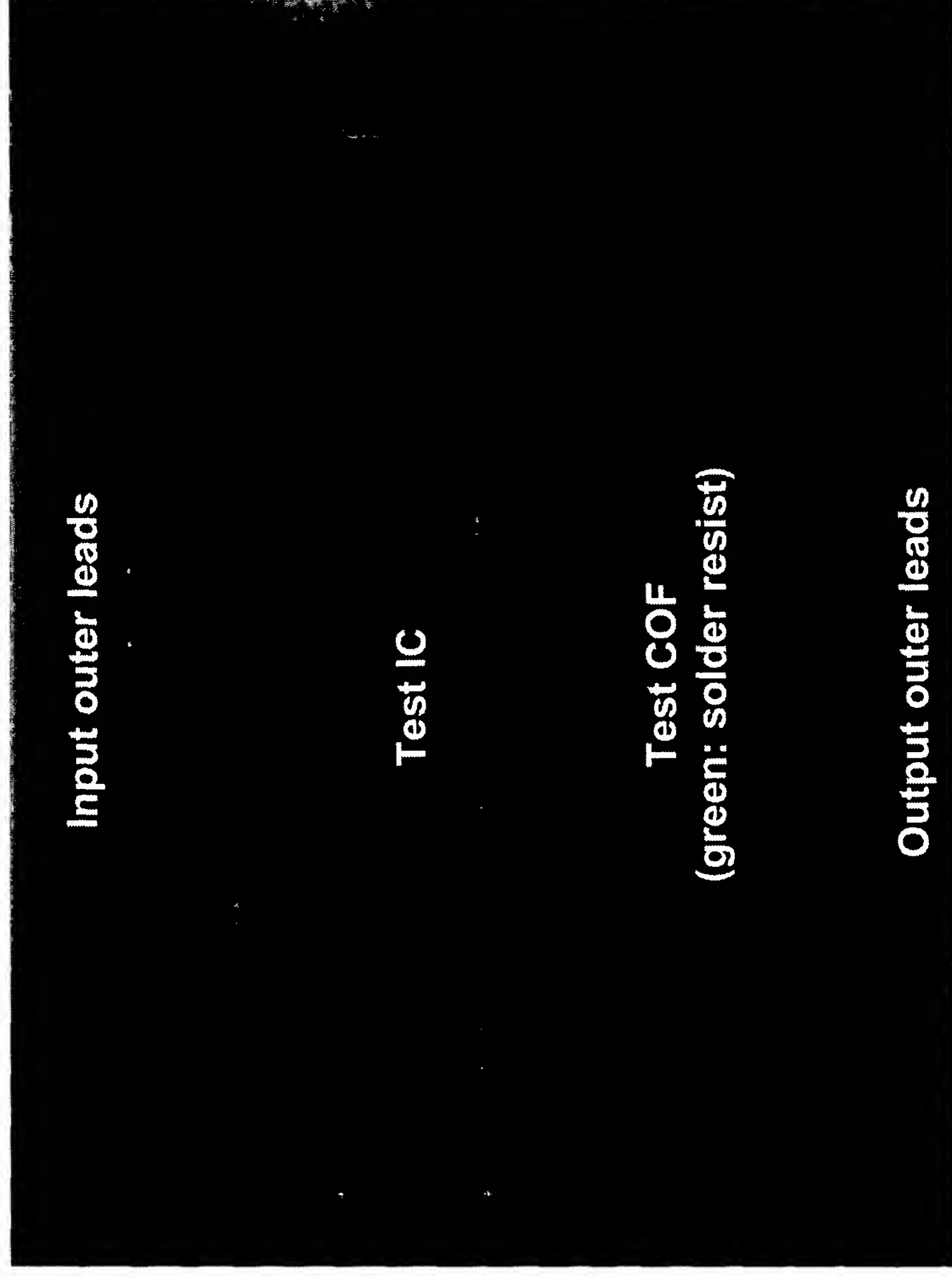
# Construction of test COF

- Layout similar to existing COF products
- Additional test structures



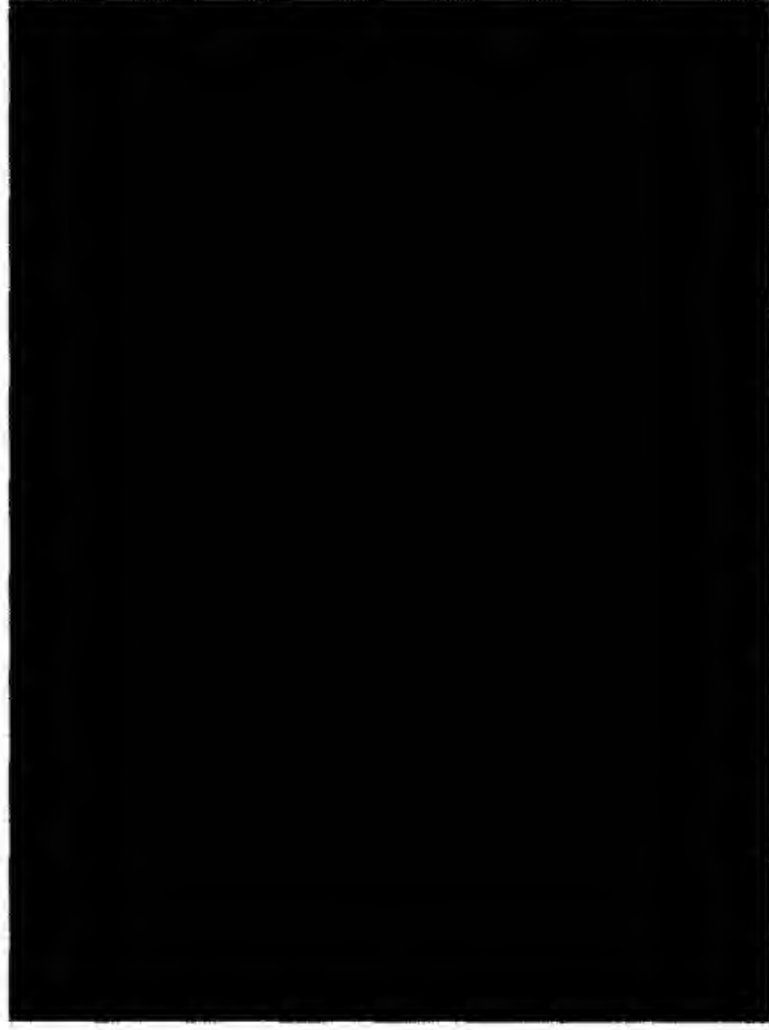
# Construction Analysis of test COF (1)

Overview (look through the tape onto die)

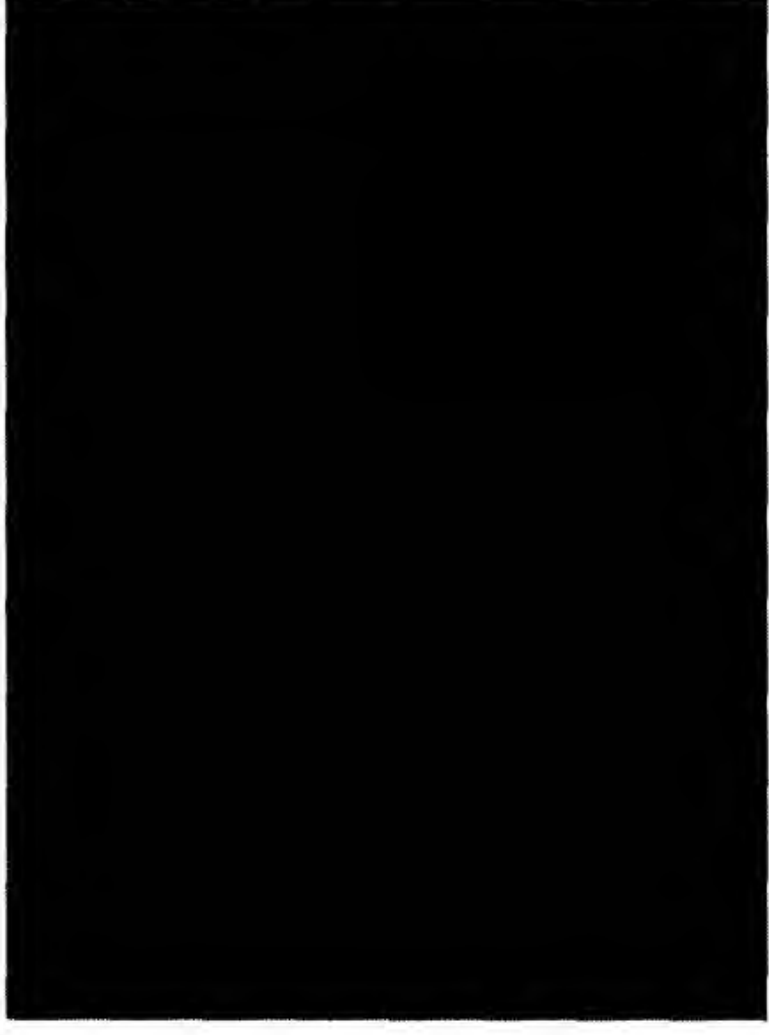


# Construction Analysis of test COF (2)

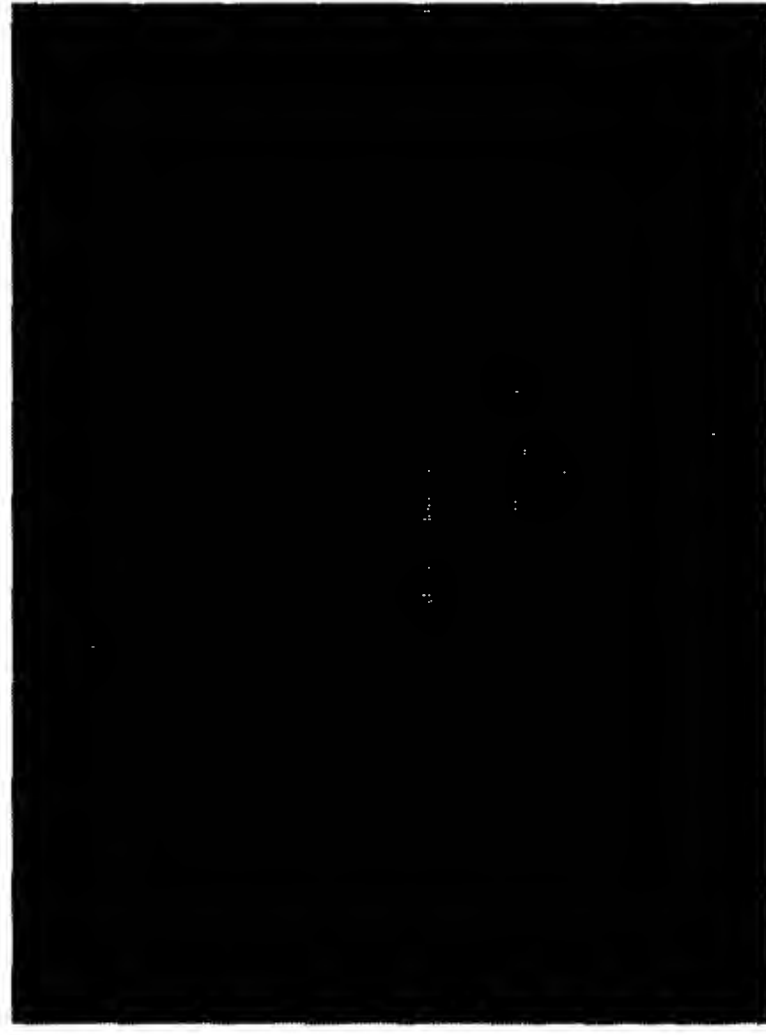
32  $\mu\text{m}$  test structure



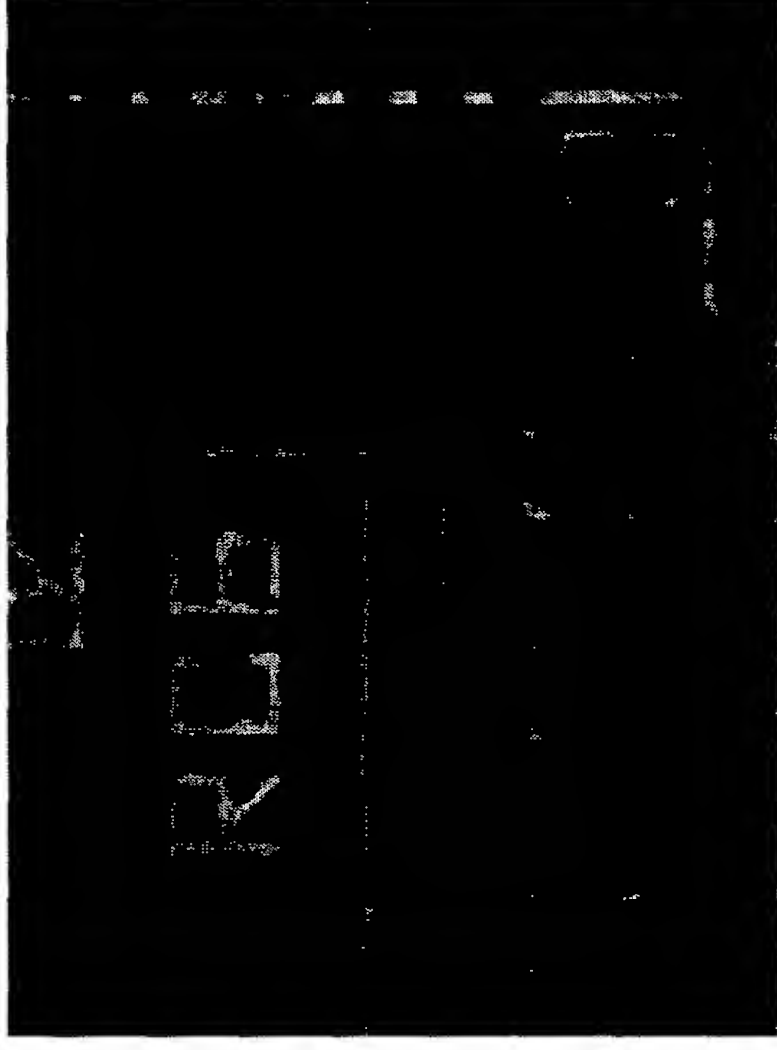
30  $\mu\text{m}$  test structure



ILB at top left corner

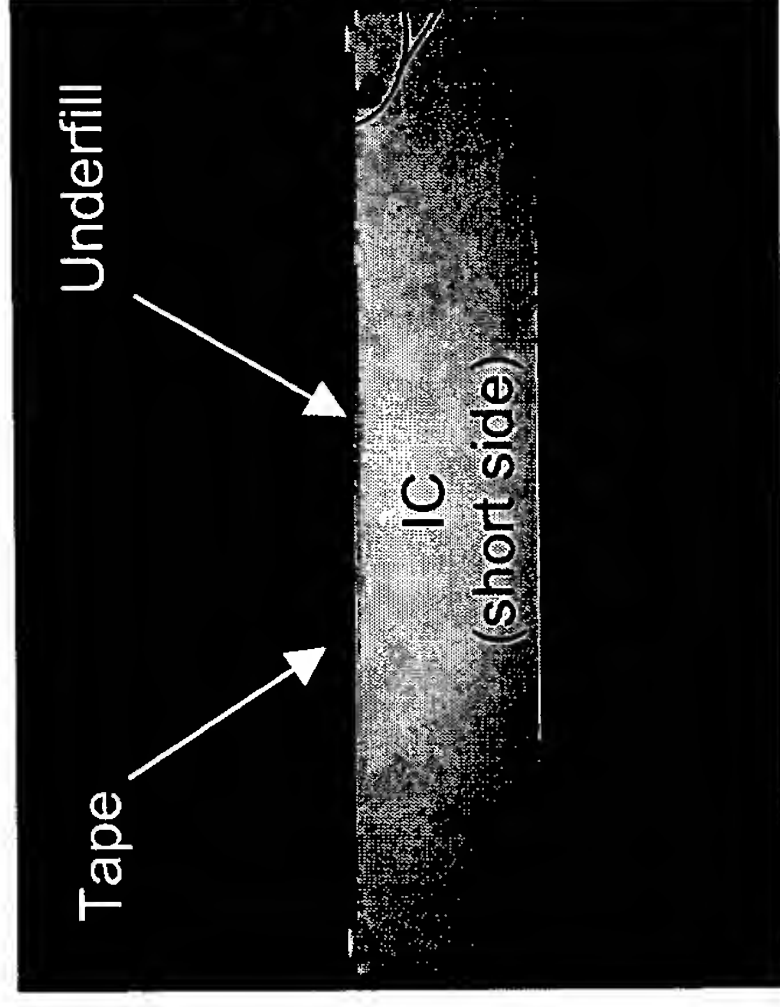


ILB at bottom right corner

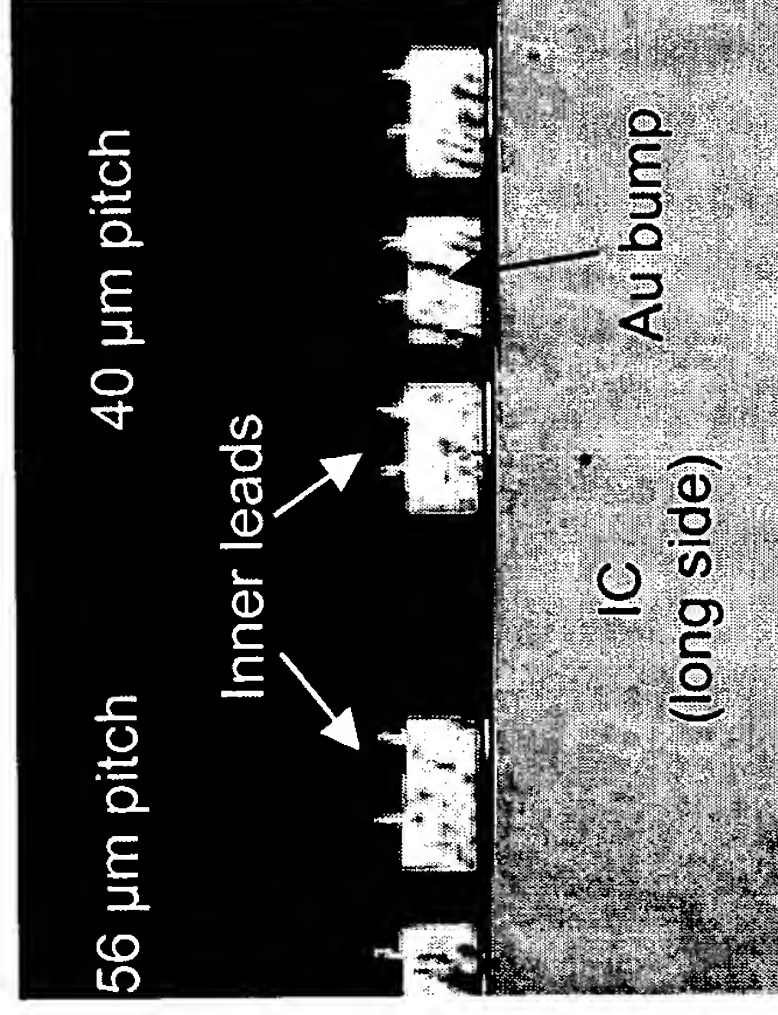


# Construction Analysis of test COF (3)

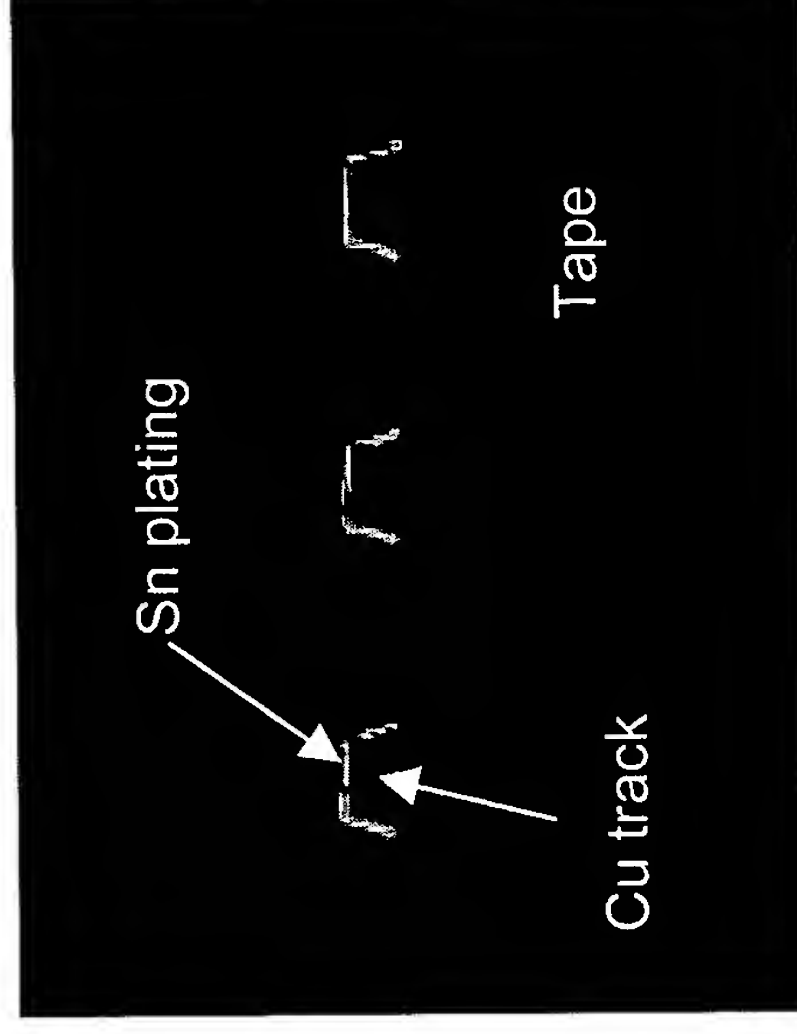
**ILB cross-sections (short side)**



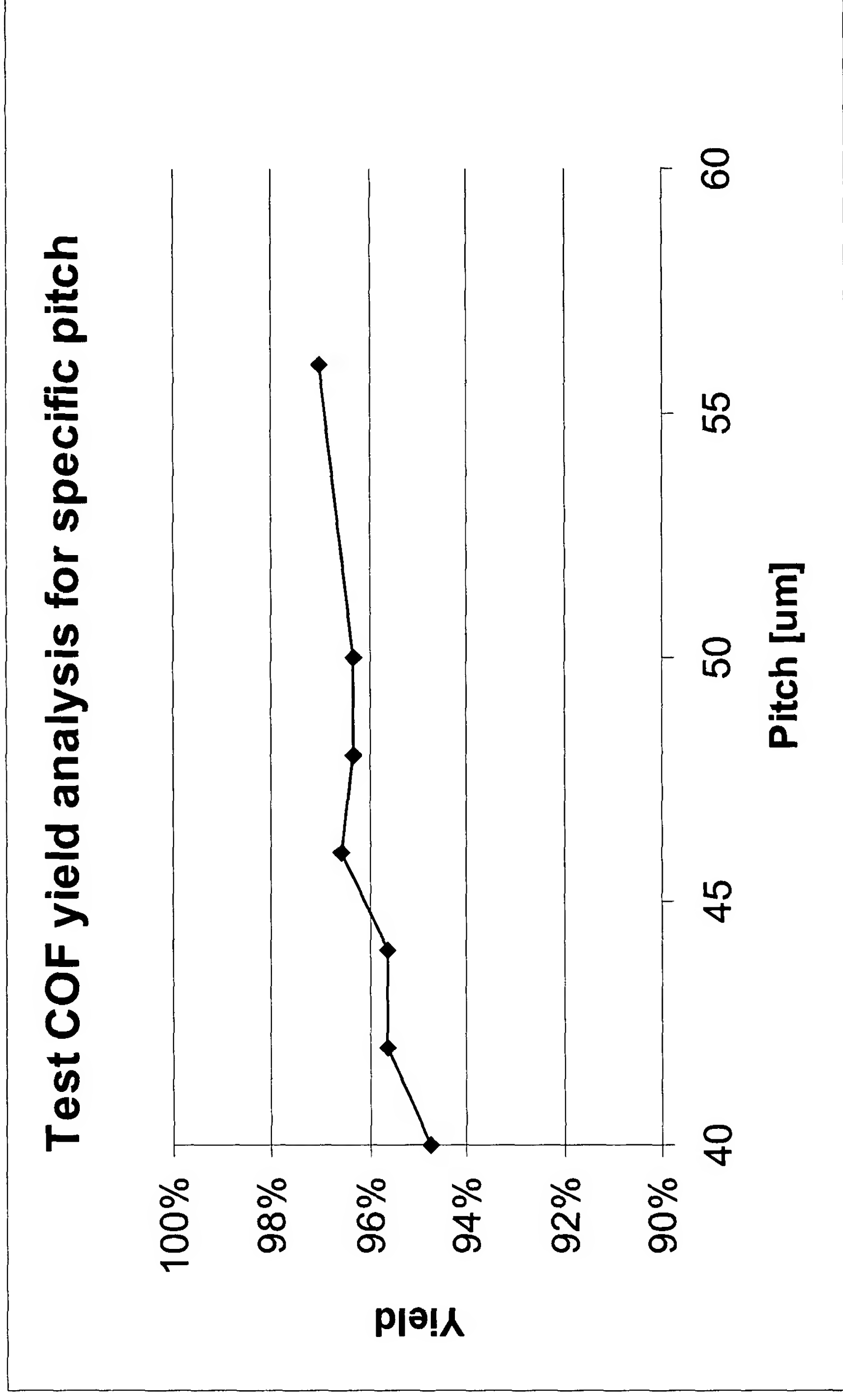
**ILB cross-section (long side)**



**Tracks on COF tape (40 µm pitch)**

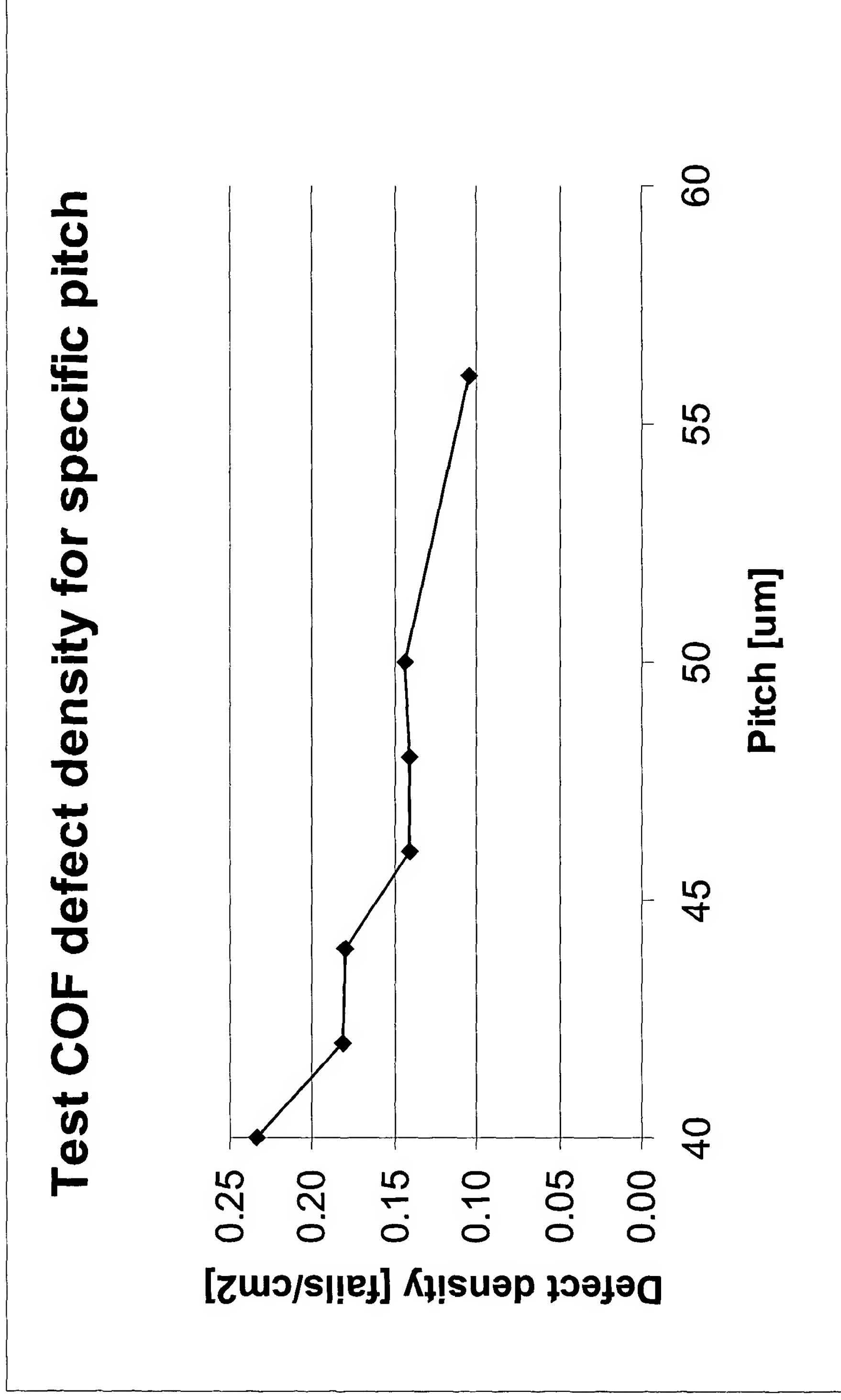


# Yield analysis of test COF (1)





# Yield analysis of test COF (2)



# Preliminary reliability test results (1)

- Most of the standard reliability tests are pass:
  - Temperature cycling (TMCL):  
-55°C, 125°C, 200 cycles
  - Unbiased highly accelerated stress test (UHST):  
125°C, 85% rH, 96 h
  - High temperature storage life (HTSL): 125°C, 1008 h

## **BUT:**

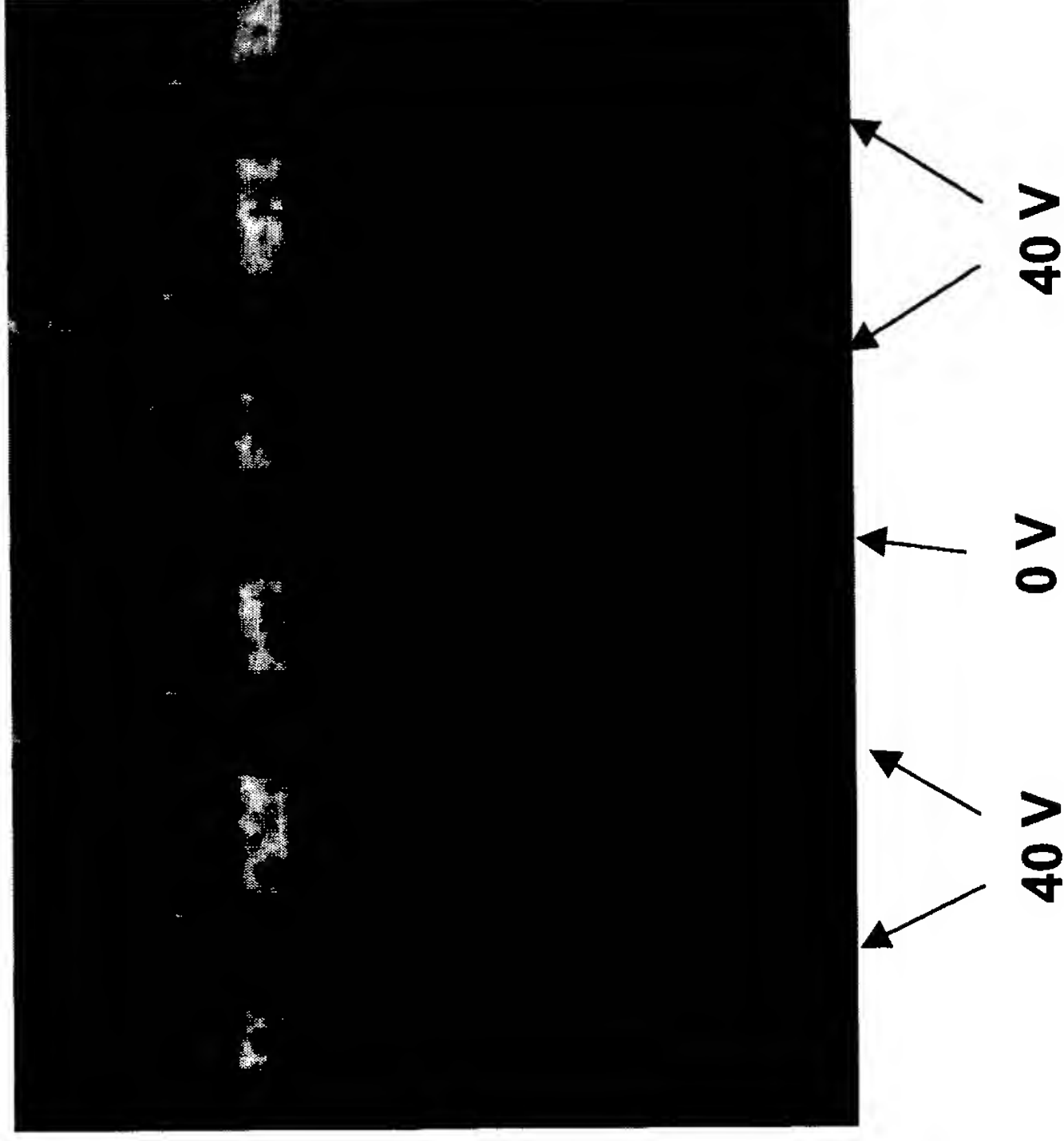
- Temperature humidity bias (THB), 85°C, 85% rH, 1008 h is fail for 25 V and 40 V bias.



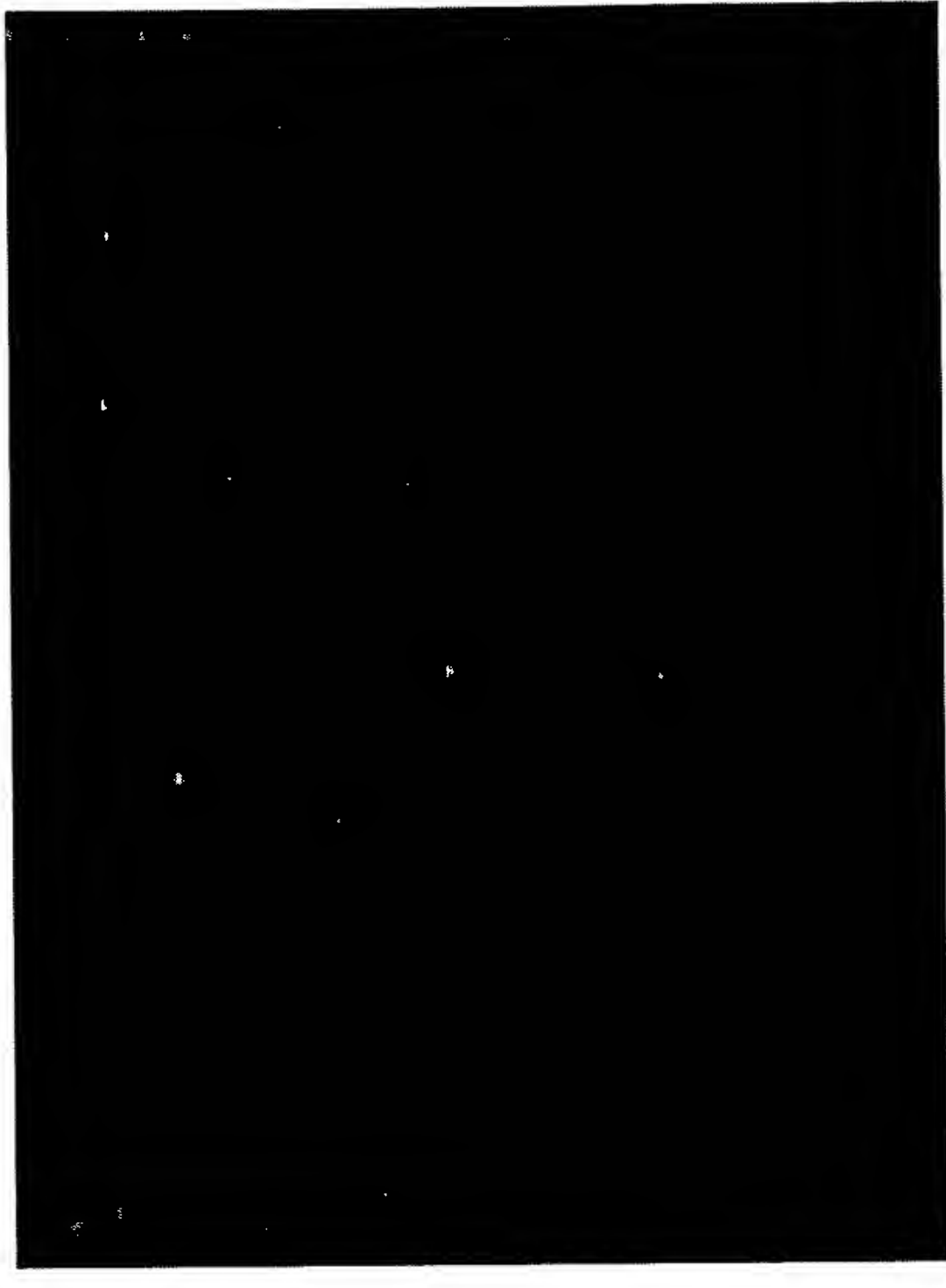
## Preliminary reliability test results (2)

- A first investigation shows that corrosion and migration occurred between the lines where with a voltage difference was applied.

Corroded on biased tracks

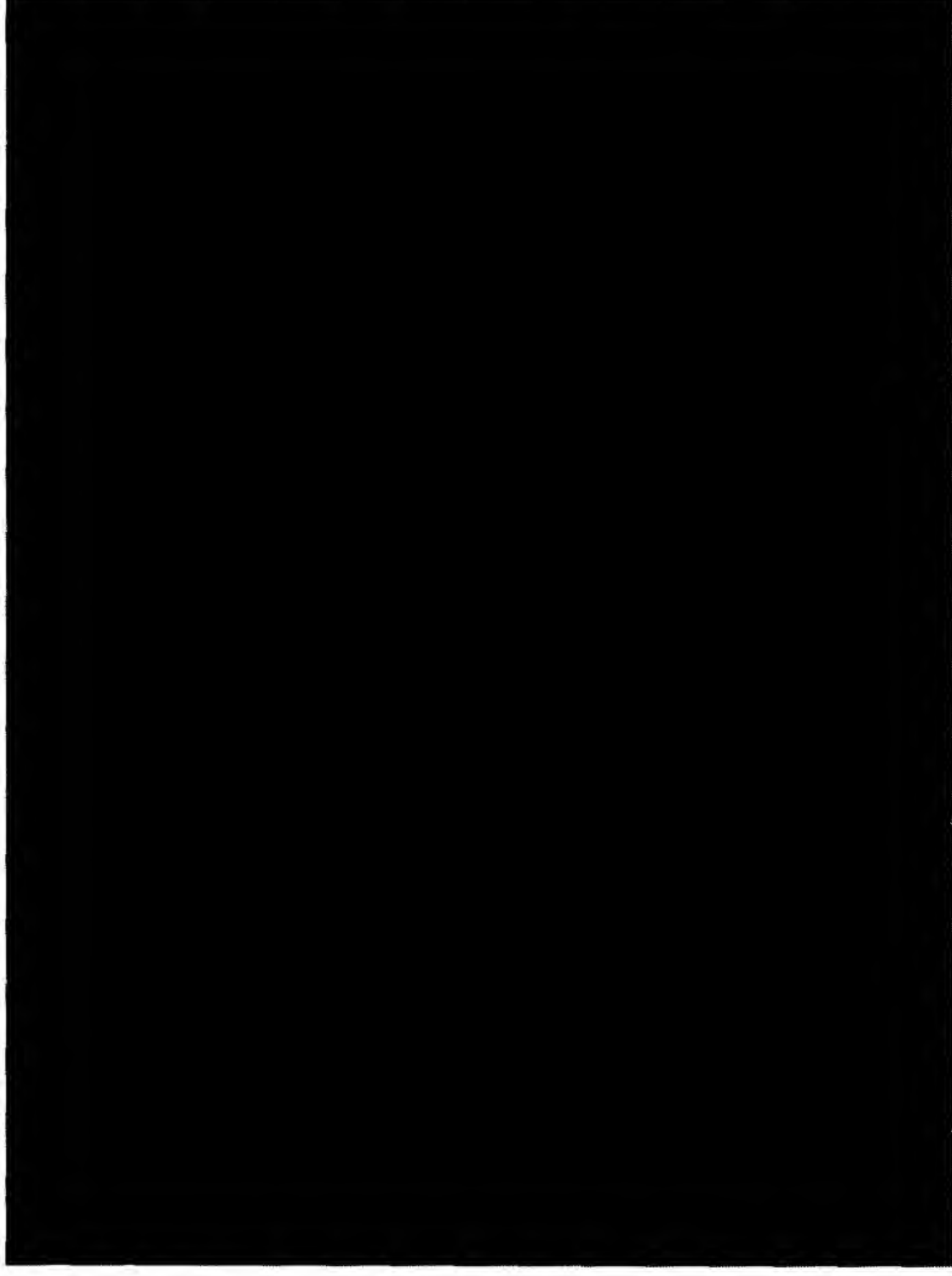


Corroded test pad



## Preliminary reliability test results (3)

- Further investigations are ongoing at Philips and at subcontractors.



“Tree-like” migration dendrites

# Conclusions

COF is an interesting alternative for future display driver applications

- The new concept seems to be a viable option to qualify new assembly processes

However, some reliability issues still need to be solved, namely the relationship between pitch and max. static bias voltage that can withstand 1008 h THB must be assessed.

